

**REMARKS**

**I. STATUS OF THE CLAIMS**

Claim 1 is amended to include the features of claims 5 and 6. Accordingly, claims 5 and 6 are canceled.

Claim 12 is amended to include the features of claims 15 and 16. Accordingly, claims 15 and 16 are canceled. Claim 17 is amended in a similar manner as claim 12.

In view of the above, it is respectfully submitted that claims 1-3, 7-14 and 17 are currently pending.

**II. OBJECTION TO CLAIM 16**

The Examiner asserts that the term "input wavelengths" should be changed to "input channels" in claim 16. As indicated above, claim 12 is amended to include the features of claim 16.

However, it is respectfully submitted that the term "input wavelengths" corresponds to the terminology used in the specification. For example, paragraphs [0012] and [0075] of the specification refer to "input wavelengths".

In view of the above, it is respectfully requested that the objection be withdrawn.

**III. REJECTION OF CLAIMS 1-3, 6-8 AND 10-17 UNDER 35 USC 103 AS BEING OBVIOUS OVER SULHOFF IN VIEW OF DRAKE**

Claim 1 recites an optical amplifier comprising (a) a first-stage optical amplifying unit and a second-stage optical amplifying unit arranged in series with respect to an optical signal, where a first pumping light is supplied to said first-stage optical amplifying unit at an output side of said first-stage optical amplifying unit as backward pumping light, and a second pumping light is supplied to said second-stage optical amplifying unit at an input side of said second-stage optical amplifying unit as forward pumping light, (b) a common automatic gain control circuit performing automatic gain control in accordance with the optical signal at an input side of the first-stage optical amplifying unit and the optical signal at an output side of said second-stage optical amplifying unit, and (c) a pumping light distribution function unit receiving a control signal from said common AGC circuit and, in accordance with the received control signal, supplying said first and second pumping lights with a predetermined distribution ratio.

Moreover, claim 1 is amended to recite that the predetermined distribution ratio causes an increased gain near an upper limit where oscillation occurs in said first-stage optical amplifying unit to thereby obtain a low noise figure, and causes fluctuation of output at said output side of said second-stage optical amplifying unit due to ASE to be suppressed when a number of input wavelengths of the optical signal at said input side of said first-stage optical amplifying unit rapidly decreases.

Therefore, claim 1 is amended to include the features of claims 5 and 6. Moreover, support for the amendments to claim 1 is also found, for example, in paragraph [0060] of the present application.

Paragraphs [0031] through [0039] of the present application discuss the problem of oscillation and the problem of fluctuation in output due to ASE with a conventional optical amplifier. The predetermined distribution ratio of embodiments of the present invention is directed to solving these problems.

None of the references discloses or suggests the above-described problems in the configuration recited, for example, in claim 1. Moreover, none of the references discloses or suggests a distribution ratio that causes the specific effects recited, for example, in claim 1.

On page 6 of the Office Action, the Examiner asserts that column 4, lines 51-64, of Drake, teaches that it is desirable to operate the amplifier with a high pump power input to the first stage to maintain a low noise figure. However, it is respectfully submitted that this portion of Drake does not discuss the problem of oscillation, and does not indicate that a distribution ratio causes an increased gain *near an upper limit where oscillation occurs in said first-stage optical amplifying unit* to thereby obtain a low noise figure, as recited, for example, in the amended claim 1.

Sulhoff discloses coils 76 and 78 that are provided with pumping light. However, in Sulhoff, coil 76 is provided with forward pumping light. This operation in Sulhoff is significantly different than that recited in claim 1, where the first pumping light is supplied to said first-stage optical amplifying unit as *backward* pumping light.

Column 4, line 49, through column 5, line 9, of Sulhoff, relates to input power fluctuations due to a drop in the number of channels. However, this portion of Sulhoff relates to the specific configuration in Sulhoff where the first-stage optical amplifying unit is supplied with forward pumping light. Sulhoff does not disclose or suggest how the pump light provided to the first-stage optical amplifying light would be controlled if backward pumping light was provided.

The above comments are specifically directed to claim 1. However, it is respectfully submitted that the comments would be helpful in understanding various differences of various other claims over the cited references.

In view of the above, it is respectfully submitted that the rejection is overcome.

IV. REJECTION OF CLAIM 9 UNDER 35 USC 103 AS BEING UNPATENTABLE  
OVER SULHOFF IN VIEW OF DRAKE AND FURTHER IN VIEW OF OHSHIMA

The comments in Section III, above, for distinguishing over Sulhoff and Drake, also apply here, where appropriate.

In view of the above, it is respectfully submitted that the rejection is overcome.

V. CONCLUSION

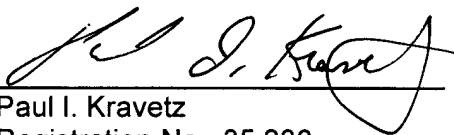
In view of the above, it is respectfully submitted that the application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

If any further fees are required in connection with the filing of this response, please charge such fees to our Deposit Account No. 19-3935.

Respectfully submitted,

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